Effects of light`s colour temperatures on visual comfort level, task performances, and alertness among students

ABSTRACT

Introduction: Correlated colour temperatures (CCT) of the light source in indoor environment plays an imperative role in addressing both psychological and physiological functions of the occupant. As one of the determinants of lighting quality, CCT are off particular importance which affects quality of work and in classroom learning. Objective: The aim of this study is to determine the effects of warm white light (WWL) (CCT = 3,000K), cool white light (CWL) (CCT = 4,000K) and artificial daylight (DL) (CCT=6,500K) on the performances, subjective alertness level, visual comfort level and preferences of student in Faculty of Medicine and Health Sciences, Universiti Putra Malaysia. Methodology: A laboratory controlled experiment was conducted on total of 47 undergraduate students volunteered to participate in a series of test under three coloured light sources. FrACT software was used to assess visual task performance, modified OLS questionnaire was used to evaluate subjective comfort level and preferences, typing test and KSS alertness level monitoring was conducted. Result: Significant increase was observed in subjective alertness level ($p=0.041$) and computer-based performances ($p=0.001$) under DL condition in relative to WWL condition. In terms of typing performances, respondents performed significantly better in term of typing speed under CWL than DL and WWL. Least typing errors were made under DL, followed by CWL and WWL. CWL is the most preferred ($p=0.001$) and most comfortable ($p=0.011$) CCT environment where subjects indicated the ability to perform task longer in this coloured-lit environment. Conclusion: The study concludes that the CWL and DL were more beneficial for alertness level and academically activities for both computer-based and paper-based activities.

Keyword: Lighting; Correlated colour temperatures; Visual comfort; Alertness level; Visual task performance